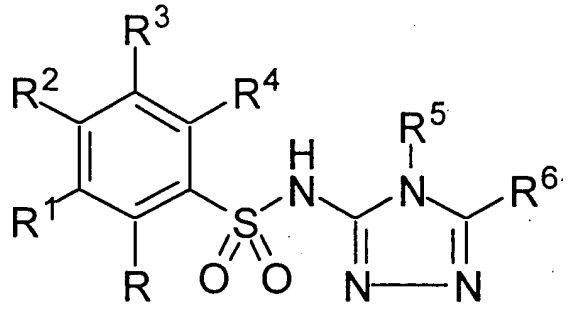
CLAIMS

What is claimed is:

1. A method of treating a bacterial infection of a mammal, comprising administering to a mammal suffering from a bacterial infection an amount of a compound active against a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105 sufficient to inhibit the growth of bacteria involved in said infection.

2. The method of claim 1, wherein said bacterial infection involves a bacterial strain expressing a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105 or a homologous gene.

3. The method of claim 2, wherein said gene corresponds to SEQ ID NO. 60 and wherein said compound has the structure:



wherein

R, R^1, R^2, and R^3 are independently H, alkyl (C_1-C_5),or halogen;

R^4 is H, alkyl (C_1-C_5), halogen, SH, or S-alkyl (C_1-C_3);

R^5 is H, alkyl (C^1-C^5), or aryl (C_6-C_{10});

R^6 is CH2NH2, alkyl (C1-C4), 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-furyl, 3-furyl, 2-thienyl, 3-thienyl, or aryl (C_6-C_{10});

or

R^5 and R^6 together are $-C(R^7)=C(R^8)-C(R^9)=C(R^{10})-$, $-N=C(R^8)-C(R^9)=C(R^{10})-$, $-C(R^7)=N-C(R^9)=C(R^{10})-$, $-C(R^7)=C(R^8)-N=C(R^{10})-$, or $-C(R^7)=C(R^8)-C(R^9)=N-$;

wherein R^7, R^8, R^9, and R^{10} are independently H, alkyl (C_1-C_5), halogen, fluoroalkyl (C_1-C_5);

or

R^7 and R^8 together are -CH=CH-CH=CH-.

4. A method of treating a bacterial infection in a mammal comprising administering to said mammal an amount of an antibacterial agent effective to reduce said infection,

wherein said antibacterial agent specifically inhibits a biochemical pathway requiring the expression product of a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105, and

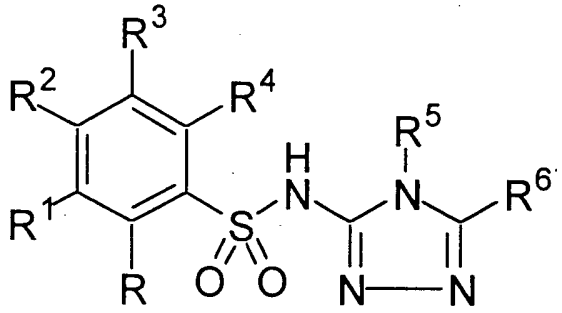
wherein inhibition of said biochemical pathway inhibits the growth of said bacterium *in vivo*.

5. A method of inhibiting the growth of a pathogenic bacterium comprising contacting said bacterium with an antibacterial agent which specifically inhibits a

biochemical pathway requiring the expression product of a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105,

wherein inhibition of said biochemical pathway inhibits the growth of said bacterium.

6. The method of claim 5, wherein said gene corresponds to SEQ ID NO. 60 and wherein said compound has the structure:



wherein

R, R^1, R^2, and R^3 are independently H, alkyl (C_1-C_5), or halogen;

R^4 is H, alkyl (C_1-C_5), halogen, SH, or S-alkyl (C_1-C_3);

R^5 is H, alkyl (C^1-C^5), or aryl (C_6-C_{10});

R^6 is CH2NH2, alkyl (C1-C4), 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-furyl, 3-furyl, 2-thienyl, 3-thienyl, or aryl (C_6-C_{10});

or

R^5 and R^6 together are $-C(R^7)=C(R^8)-C(R^9)=C(R^{10})-$, $-N=C(R^8)-C(R^9)=C(R^{10})-$, $-C(R^7)=N-C(R^9)=C(R^{10})-$, $-C(R^7)=C(R^8)-N=C(R^{10})-$, or $-C(R^7)=C(R^8)-C(R^9)=N-$;

wherein R^7, R^8, R^9, and R^{10} are independently H, alkyl (C_1-C_5), halogen, fluoroalkyl (C_1-C_5);

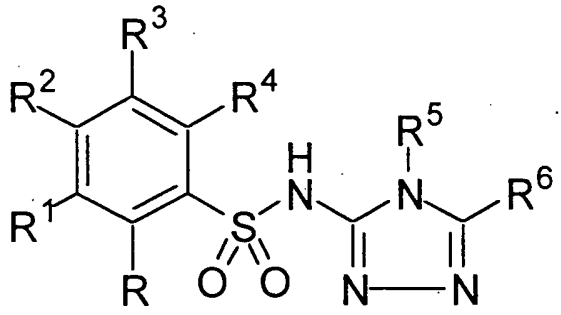
or

R^7 and R^8 together are -CH=CH-CH=CH-.

7. The method of claim 4 or 5 wherein said antibacterial agent inhibits the activity of an expression product of a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

8. A method of prophylactic treatment of a mammal, comprising administering to a mammal at risk of a bacterial infection a compound active against a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

9. The method of claim 8, wherein said gene corresponds to SEQ ID NO. 60 and wherein said compound has the structure:



wherein

R, R^1, R^2, and R^3 are independently H, alkyl (C_1-C_5), or halogen;

R^4 is H, alkyl (C_1-C_5), halogen, SH, or S-alkyl (C_1-C_3);

R^5 is H, alkyl (C^1-C^5), or aryl (C_6-C_{10});

R^6 is CH2NH2, alkyl (C1-C4), 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-furyl, 3-furyl, 2-thienyl, 3-thienyl, or aryl (C_6-C_{10});

or

R^5 and R^6 together are $-C(R^7)=C(R^8)-C(R^9)=C(R^{10})-$, $-N=C(R^8)-C(R^9)=C(R^{10})-$, $-C(R^7)=N-C(R^9)=C(R^{10})-$, $-C(R^7)=C(R^8)-N=C(R^{10})-$, or $-C(R^7)=C(R^8)-C(R^9)=N-$;

wherein R^7, R^8, R^9, and R^{10} are independently H, alkyl (C_1-C_5), halogen, fluoroalkyl (C_1-C_5);

or

R^7 and R^8 together are -CH=CH-CH=CH-.

10. A method of screening for an antibacterial agent,

comprising determining whether a test compound is active against a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

11. A method of claim 10, comprising the steps of:

a. providing a bacterial strain having a mutant form of a gene selected from a group consisting of the genes corresponding to SEQ ID NO. 1-105, or a gene homologous

thereto, wherein said mutant form of the gene confers a growth conditional phenotype;

b. providing comparison bacteria of a bacterial strain having a normal form of said gene;

b. contacting bacteria of said bacterial strains with a test compound in semi-permissive growth conditions;

c. determining whether the growth of said bacteria having said mutant form of a gene is reduced in the presence of said test compound compared to the growth of said comparison bacteria.

12. A method of screening for an antibacterial agent, comprising the steps of:

a) contacting a cell expressing a polypeptide encoded by a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105 with a test compound; and

b) determining whether the amount or level of activity of said polypeptide is altered;

wherein an alteration in said amount or level of activity of said polypeptide is indicative of a useful antibacterial agent.

13. A method of screening for an antibacerial agent, comprising the steps of:

a) contacting a polypeptide or a biologically active fragment thereof with a test compound, wherein said polypeptide is encoded by a gene selected from a group

consisting of the genes corresponding to SEQ ID NO. 1-105; and

b) determining whether said test compound binds to said polypeptide or said fragment;

wherein binding of said test compound to said polypeptide or said fragment is indicative of a useful antibacterial agent.

14. A method for evaluating an agent active on a gene selected from a group consisting of the genes corresponding to SEQ ID NO. 1-105, comprising the steps of:

a) contacting a sample containing an expression product of said gene with said agent; and

b) determining the amount or level of activity of said expression product in said sample.

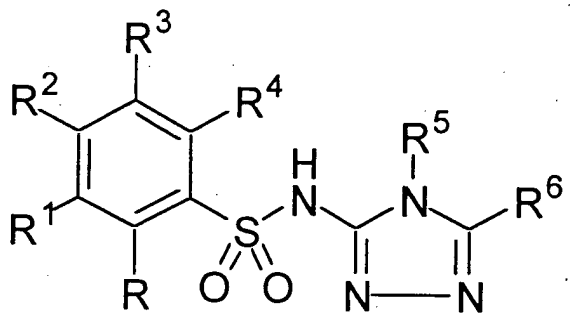
15. A method of diagnosing the presence of a bacterial strain having a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105, comprising probing with an oligonucleotide at least 15 nucleotides in length which specifically hybridizes to a nucleotide sequence which is the same as or complementary to a portion of the sequence of a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

16. A method of diagnosing the presence of a bacterial strain, comprising specifically detecting the

presence of the transcriptional or translational product of a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

7 11. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and a compound active on a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

18. The pharmaceutical composition of claim 17, wherein said bacterial gene corresponds to SEQ ID NO. 60 and wherein said compound has the structure:



wherein

R, R^1, R^2, and R^3 are independently H, alkyl (C_1-C_5),or halogen;

R^4 is H, alkyl (C_1-C_5), halogen, SH, or S-alkyl (C_1-C_3);

R^5 is H, alkyl (C^1-C^5), or aryl (C_6-C_{10});

R^6 is CH2NH2, alkyl (C1-C4), 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-furyl, 3-furyl, 2-thienyl, 3-thienyl, or aryl (C_6-C_{10});

or

R^5 and R^6 together are $-C(R^7)=C(R^8)-C(R^9)=C(R^{10})-$, $-N=C(R^8)-C(R^9)=C(R^{10})-$, $-C(R^7)=N-C(R^9)=C(R^{10})-$, $-C(R^7)=C(R^8)-N=C(R^{10})-$, or $-C(R^7)=C(R^8)-C(R^9)=N-$;

wherein R^7, R^8, R^9, and R^{10} are independently H, alkyl (C_1-C_5), halogen, fluoroalkyl (C_1-C_5);

or

R^7 and R^8 together are $-CH=CH-CH=CH-$.

19. A method for making an antibacterial agent, comprising the steps of:

a. screening for an agent active on one of the genes corresponding to SEQ ID NO. 1-105 by

providing a bacterial strain having a mutant form of a gene selected from a group consisting of the genes corresponding to SEQ ID NO. 1-105, or a gene homologous thereto, wherein said mutant form of the gene confers a growth conditional phenotype,

providing comparison bacteria of a bacterial strain having a normal form of said gene,

contacting bacteria of said bacterial strains with a test compound in semi-permissive growth conditions, and

determining whether the growth of said bacteria having said mutant form of a gene is reduced in the presence of said test compound compared to the growth of said comparison bacteria; and

b. synthesizing said agent in an amount sufficient to provide said agent in a therapeutically effective amount to a patient.

20. A novel compound having antibacterial activity, wherein said antibacterial activity is against a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105 or a product thereof.

21. A purified bacterial strain expressing a mutated gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105,

wherein said mutated gene confers a growth conditional phenotype.

22. A recombinant bacterial cell containing an artificially inserted DNA construct comprising a DNA sequence which is the same as or complementary to a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-3, 8, 11-20, 31-48, 59-68, 71, 76-87, 92-97, and 100-105.

23. A recombinant cell containing an artificially inserted DNA construct comprising a DNA sequence which is the same as or complementary to a portion at least 15 nucleotides in length, of a bacterial gene selected from the

group consisting of the genes corresponding to SEQ ID NO. 1-3, 8, 11-20, 31-48, 59-68, 71, 76-87, 92-97, and 100-105.

24. An oligonucleotide probe at least 15 nucleotides in length which specifically hybridizes to a nucleotide sequence which is the same as or complementary to a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-3, 8,11-20, 31-48, 59-68, 71, 76-87, 92-97, and 100-105.

25. An isolated or purified DNA sequence at least 15 nucleotides in length, comprising a nucleotide base sequence which is the same as or complementary to a portion of the base sequence of a bacterial gene corresponding to SEQ ID NO. 1-3, 8,11-20, 31-48, 59-68, 71, 76-87, 92-97, and 100-105.

26. A DNA sequence of claim 25, the base sequence of which is the same as or complementary to the base sequence of the coding region of a bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-3, 8, 11-20, 31-48, 59-68, 71, 76-87, 92-97, and 100-105.

27. An isolated or purified DNA sequence, the base sequence of which is the same as or complementary to a bacterial gene which is homologous to a bacterial gene

selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105,

wherein the function of the expression product of said homologous gene is the same as the function of the product of said gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105.

28. An isolated or purified DNA sequence, the base sequence of which is the same as the base sequence of a mutated bacterial gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-105,

wherein expression of said DNA sequence or of said mutated bacterial gene confers a growth conditional phenotype in the absence of expression of a gene which complements said mutation.

29. A purified, enriched, or isolated polypeptide encoded by a gene selected from the group consisting of the genes corresponding to SEQ ID NO. 1-3, 8, 11-20, 31-48, 59-68, 71, 76-87, 92-97, and 100-105.

30. The polypeptide of claim 29, wherein said polypeptide is expressed from a recombinant gene.